

- 1. DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence.
- 2. The DNA according to claim 1 wherein a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is either of the following proteins (a) or (b):
- (a) a protein comprising the sequence of amino acids shown in Seq. ID No: 2, or
- a protein comprising a sequence of amino acids wherein one or more of amino acids (b) are deleted, substituted, or added in the sequence of amino acids shown in Seq. ID No: 2, and having reactivity against bacterial DNA having an unmethylated CpG sequence.
- 3. The DNA according to claim 1 comprising the sequence of bases shown in Seq. ID No: 1 or its complementary sequence, or part or whole of the sequences.
- The DNA according to claim 1 which hybridizes with the DNA comprising a gene according to claim 3 under a stringent condition.
- 5. The DNA according to claim 1 wherein a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is either of the following proteins (a) or (b):
- (a) a protein comprising the sequence of amino acids shown in Seq. ID No: 4, or
- (b) a protein comprising a sequence of amino acids wherein one or more of amino acid are deleted, substituted, or added in the sequence of amino acids shown in Seq. ID No: 4, and having reactivity against bacterial DNA having an unmethylated CpG sequence.
- The DNA according to claim 1 comprising the sequence of bases shown in Seq. ID No: 3 or its complementary sequence, or part or whole of the sequences.
- The DNA according to claim 1 which hybridizes with the DNA comprising the gene 7. according to claim 6 under a stringent condition.
- 8. A receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence.
- 9. The protein according to claim 8 comprising the sequence of amino acids shown in Seq. ID No: 2.
- 10. The protein according to claim 8 comprising a sequence of amino acids wherein one or more of amino acids are deleted, substituted or added in the sequence of amino acids shown in Seq. ID No: 2.

- 11. The protein according to claim 8 comprising the sequence of amino acids shown in Seq. ID No: 4.
- 12. The protein according to claim 8 comprising a sequence of amino acids wherein one or more of amino acids are deleted, substituted or added in the sequence of amino acids shown in Seq. ID No: 4.

503 A3

- 13. A fusion protein comprising the protein according to any one of claims 8 to 12 fused with a marker protein and/or a peptide tag.
- 14. An antibody specifically bound to the protein according to any one of claims 8 to 12.
- 15. The antibody according to claim 14 which is a monoclonal antibody.
- 16. A host cell comprising an expression system expressing the protein according to any one of claims & to 12.
- 17. A non-human animal wherein a gene encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is excessively expressed.
- 18. A non-human animal wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome.
- 19. The non-human animal according to claim 18 having no reactivity against bacterial DNA having an unmethylated CpG sequence.
- 20. The non-human animal according to any one of claims 17 to 19 characterized in that a rodent animal is a mouse.
- 21. A method of preparing a cell expressing a protein having reactivity against bacterial DNA having an unmethylated CpG sequence characterized in that the DNA according to any one of claims 1 to 7 is introduced into a cell wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome.
- 22. A cell expressing a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence obtained by the method of preparing a cell expressing a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence according to claim 21.
- 23. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: in vitro culturing a cell expressing a receptor protein specifically recognizing bacterial DNA

4 )0/

having an unmethylated CpG sequence in the presence of a target substance, and measuring/evaluating TLR9 activity.

- 24. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: administrating a target substance to a non-human animal wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome, and measuring/evaluating TLR9 activity of macrophages or spleen cells obtained from the non-human animal.
- 25. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: administrating a target substance to a non-human animal wherein a gene encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is excessively expressed, and measuring/evaluating TLR9 activity of macrophages or spleen cells obtained from the non-human animal.
- 26. A screening method for an agonist or an antagonist of a protein having reactivity against bacterial DNA having the unmethylated CpG sequence according to either of claims 24 or 25 using a mouse as a non-human animal.
- 27. An agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence obtained by the screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having the unmethylated CpG sequence according to any one of claims 23 to 26.
- 28. A pharmaceutical composition comprising whole or part of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence as an active component.
- 29. A pharmaceutical composition comprising the agonist or antagonist according to claim 27 as an active component.
- 30. A kit used to diagnose diseases related to the deletion, substitution and/or addition in a sequence of DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising the DNA according to claim 3, which can compare a sequence of DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence in a test body with a sequence of bases in the DNA according to claim 3.

AND AND